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IN THE

Supreme Court of the United States

OCTOBER TERM, 1948.

16

MANDEL BROS., INC., a corporation, Petitioner,
vs.
JOHN H. WALLACE, JR., Respondent.

No. 16

BRIEF FOR RESPONDENT.

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INDEX

	PAGE
Opinions of the Courts Below	1
Jurisdiction	1
Statement of Facts	2
Summary of Argument	3
Argument	6
(1) The Invention	6
(2) The Need for a Non-corrosive Anti-perspirant	7
(3) Acidity is necessary in an Anti-perspirant	8
(4) The Invention satisfied a long felt Need	12
(5) Corrosion was a Serious Problem	13
(6) The Prior Art is completely Irrelevant	16
(A) The Alleged Prior use by Wallace and Hand	16
(B) Shipp patent 2,174,534	19
(C) Koch patent 2,011,292	22
(D) Missbach patent 2,069,711	23
(7) Non-analogous Art	24
(a) Wallace and Hand made a Patentable Invention	26
(8) The New York Decision 133 F. (2d) 763	26
(9) A Three Party Interference is no evidence of Lack of Invention	28
(10) The Cases cited by Petitioner	29
(11) Petitioner's Specification of Errors	31
Conclusion	32
Appendix	1a

Table of Cases

PAGE

A. J. Deer Co., Inc., v. U. S. Slicing Mach. Co., 21 F. (2d) 812 (C. C. A. 7) 4, 24

Dow Chemical Company v. Halliburton Oil Well Cementing Company, 324 U. S. 320 ..... 20, 30

Funk Brothers Seed Company v. Kalo Inoculant Company, 333 U. S. 127 30

Goodyear Tire & Rubber Company v. Ray-O-Vac Company, 321 U. S. 275 ..... 2, 5, 28

Hotchkiss, et al., v. Greenwood, et al., 11 How. 248 ..... 5, 29

Hutzler Bros. Co. v. Sales Affiliates, Inc., 164 F. (2d) 260, 264 (C. C. A. 4) 4, 25

Smith v. Snow, 294 U. S. 1, 17 ..... 4, 25

Telephone Cases, 126 U. S. 1, 551 29

Wallace v. F. W. Woolworth Co., 133 F. (2d) 763 (C. C. A. 2) 1, 26, 27

45 F. Supp. 465 (Dist. Ct. E. Dist. N. Y.) 1

Williams Manufacturing Company v. United Shoe Machinery Corporation, 316 U. S. 364 2

Yablick v. Protecto Safety Appliance Corporation, 21 F. (2d) 885, 886 25

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To the Honorable Chief Justice and Associate Justices of the Supreme Court of the United States:

OPINIONS OF THE COURTS BELOW.

The opinion of the Seventh Circuit Court of Appeals in this case is reported at 164 F. (2d) 861. The District Court opinion appears at 67 F. Supp. 814.

The opinion of the District Court of New York in the case of *Wallace* v. *Woolworth* was reported at 45 Fed. Supp. 465. The opinion of the Second Circuit Court of Appeals in that case is reported at 133 F. (2d) 763.

JURISDICTION.

Jurisdiction arises from a Writ of Certiorari granted March 15, 1948.

STATEMENT OF FACTS.

Substantially every fact asserted by the Circuit Court of Appeals of the Seventh Circuit is also backed up by a finding of fact of the District Court. Substantially every allegation made in this brief is based upon a concurrent finding of the District Court and the Court of Appeals. Findings of Fact 7 to 12, inclusive, and 18 and 19, pp. 146, 147 and 148, cover the gist of the case.

Under the established rule of this court, as set forth in *Williams* v. *United Shoe Machinery Corp.*, 316 US 364, and *Goodyear* v. *Ray-O-Vac*, 321 US 275, such findings will not be disturbed.

While there are several material misstatements of fact in the Statement of Facts of Petitioner, clarity and brevity will best be served by discussing these points in connection with those portions of the argument to which they apply, rather than at this point, out of their context.

SUMMARY OF ARGUMENT

The Invention

Aluminum chloride and aluminum sulfate are acid reacting salts. Because of this acidity, they are both corrosive and perspiration inhibiting. Reducing the acidity reduces perspiration inhibition. Urea, like other anti-acids, was known to react with acids, like sulfuric acid, and reduce both their acidity and corrosiveness. If it acted in the same way with these acid salts, as would be expected, it would be worthless in an anti-perspirant. Other anti-acids act with these salts to reduce both acidity and corrosiveness. Urea reduces only corrosiveness, which was not only unpredictable, but cannot yet be explained. As a result, unlike other anti-acids, it can be added to an anti-perspirant without reducing the anti-perspirant effect, and yet stop corrosion. (Findings of Fact 8, 12, 18 - pp. 146, 148.)

The need for a non-corrosive anti-perspirant had existed for a long time. (Findings of Fact 7 and 10; R. 146.)

The Invention Satisfied a Long Felt Want.

Commercial acceptance was prompt and secured without unusual advertising. The Court of Appeals below found that the invention completely satisfied the need. (P. 193)

Corrosion was a Serious Problem.

The unprotected anti-perspirant cannot be used immediately after shaving. It rots the clothing slowly at room temperature, and immediately at ironing temperature. (Physical Exhibit 4, Finding of Fact 10, p. 146.)

The Prior Art is Completely Irrelevant.

It shows nothing more than the admitted fact that urea was known to react with acids and reduce their corrosiveness. It did not show that urea would act differently with a corrosive acid salt than it did with an acid, and differently than other anti-acid materials acted with acid salts.

The alleged prior use of the patentees was of a product which did not contain urea. Urea and an acid were mixed to make it. The uncontradicted testimony is that the urea reacted and disappeared. (p. 133) While the urea reduced corrosiveness it did so only at the expense of anti-perspirant value. If the urea acted the same way with an astringent salt, it would be worthless. Every court which has passed on the subject has found against Petitioner on this alleged anticipation.

Shipp patent 2,174,534 is irrelevant because it merely shows the addition of urea to strong sulfuric acid to slow down, but not stop, its corrosion on cloth. The urea reacts with the acid. No acid salt is involved so that the patent cannot teach how urea will behave with an acid salt. If it behaved as in Shipp, it would be worthless in an anti-perspirant. The other things that work in Shipp and are said to be the equivalent of urea, do not work in an anti-perspirant.

The slowing down of the attack of concentrated sulfuric acid on cloth is entirely non-analogous to the use of an acid salt on the skin.

Hutzler v. *Sales Affiliates,* 164 F. (2d) 260, 264 (CCA 4).

Deer Co. v. *U. S. Slicing Machine Co.,* 21 F. (2d) 812 (CCA7).

Smith v. *Snow,* 294 US 1, 17.

Koch 2,011,292 does not use urea to stop corrosion. He claims to use it to stabilize a solution of aluminum acetate. It is claimed to be the equivalent of borax for this purpose, and thus cannot teach that urea would act differently than borax with an anti-perspirant. Borax is worthless in an anti-perspirant.

Missbach 2,011,711 shows merely the admitted fact that urea neutralizes acids.

The New York decision is on a different record. There was no proof of long felt want. The court failed to understand the distinction between acids and acid salts.

There is Invention.

This court has never departed from the doctrine that doing more than is expected of one acquainted with the business is invention. *Hotchkiss* v. *Greenwood*, 11 How 248. *Goodyear* v. *Ray-O-Vac*, 321 US 275.

In the present case not only did urea act in an unexpected manner, but even in this record there is no teaching as to why urea acts differently with acid salts than other anti-acids do.

ARGUMENT.

1. The Invention.

The unpredictable discovery, which resulted in the present invention, is the fact that urea behaves differently with an acid than with an acid (astringent) salt.* Both acids and acid salts, in water, produce hydrogen ions, and their acidity and their corrosiveness are due to the presence of these hydrogen ions. As we have pointed out at length in the Appendix, the hydrogen ions from acids and acid salts are identical and there was no prior art of any kind to indicate that urea would act differently with the hydrogen ions from an acid than with the hydrogen ions from an acid salt. Urea, like all other basic materials, reacts with an acid and forms a compound. Urea does not react with an acid salt, whereas ordinary basic materials do. No one has been able to explain the reason for this distinction and yet if it were not for this difference urea would not be of any value in an anti-perspirant.

There was no known law or even an indication that urea would fail to react with an acid salt. Its reaction with acids was well known. The reaction of basic materials generally with acid salts was known. It is Respondent's position that any chemist would have assumed that urea

*An acid is a substance which contains hydrogen in such a form that it will form hydrogen ions in water. Examples are HCl and H_2SO_4. We have used the term acid salt to indicate a salt, like aluminum chloride, $AlCl_3$ where the hydrogen has been replaced by a metal. The salt does not contain hydrogen but in the presence of water produces an acid reaction by hydrolysis with water. The chemistry of this reaction is explained in the appendix.

would also react with an acid salt, and it was only by going contrary to what should have been thus assumed, that Wallace and Hand made their discovery.

No routine experiment would have led in this direction and no routine experimenter would have thought of making this combination. It would have seemed obvious to him that it would not work. He should have expected that the urea would combine with the acid salt and destroy its needed astringency as well as its corrosiveness in the same way other anti-acids do.

The patent[1] covers the combination in an antiperspirant, of a normally corrosive, astringent salt, such as aluminum chloride, with an amino compound such as urea.[1a] Both corrosion and anti-perspirant effect are due entirely to the acidity of the salt[2]. Urea has the property, still unexplained, of inhibiting against the acid corrosion without affecting the acid antiperspirant capacity of the salt. No other substances are known which have this paradoxical property. No prior art used urea with a corrosive acid salt, or hinted that it might solve the problem of actively inhibiting the corrosive action but not the antiperspirant effect of the salt's acidity.

2. The Need for a Non-Corrosive Anti-Perspirant.

Cosmetic preparations for the removal or prevention of the odors of perspiration have been made and sold for a long time. (Findings of Fact 7 and 16, pp. 146-7.)

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[1] R. 167.

[1a] Since the preferred amino compound is urea and all parties use it, we focus our discussion on it. The patent shows others of this group to be operable but they are not and have not been in issue.

[2] Findings of Fact 8, 9, 10, R. 146.

The modern compositions for preventing perspiration odors fall into two classes, deodorants and antiperspirants. Deodorants, which are probably the older, do not seek to stop perspiration, but, so far as they can, mask its odor or attempt to overcome it.

Antiperspirants, into which class the patent in suit and the petitioner's composition fall, attack the problem by inhibiting the flow of perspiration sufficiently to overcome perspiration odors. They likewise reduce or eliminate contact of perspiration with clothing.

Deodorants were sometimes supplied as creams, as for example, the well known deodorant "Mum". (Finding of Fact 7, p. 146.) The record shows no successful antiperspirant cream prior to plaintiff's patents. The earliest antiperspirant commonly known to the public was "Odorono", which was supplied as a liquid.

3. Acidity Is Necessary in an Antiperspirant.

Perspiration inhibiting compounds depend upon the acidity (astringency) of a salt.[3] The aluminum salts of strong acids, especially aluminum chloride and aluminum sulfate, the aluminum salts of hydrochloric acid and sulfuric acid, respectively, are usually employed. The antiperspirant in order to be effective, must be strongly astringent, and the degree of astringency is determined by the acidity of the salt. This acidity is measured by chemists in terms of the concentration of hydrogen ions in solution, which is technically given the symbol pH.[4] Acidity is caused exclusively by the presence of hydrogen ions—that is positively charged hydrogen ions which exist in solution (H^+). The pH or concentration of these ions can range from 0 to 14, 7 representing the neutral point.

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[3] Finding of Fact 8 R. 146.

[4] Finding of Fact 8 and 9 R. 146.

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A pH of 0 represents the highest possible acidity. Thus the lower the pH, the higher is the acid character of acidity of the solution. Any substantial increase in pH in an antiperspirant results in a loss of astringency and effectiveness.[5]

This acidity, or pH of the solution, which is necessary in order to make a salt astringent, and, therefore, is necessary for its effectiveness as an antiperspirant, we have called the primary acid effect of the aluminum salts of strong acids.

The insurmountable difficulties which had existed in all antiperspirant compositions prior to those here patented, was that astringent salts, such as aluminum chloride, are, because of their acidity, corrosive to fabrics, slowly at body temperature, and rapidly under the heat of ironing.[6] They are also very irritating to the skin of some users. (i.e. "Odorono" advises its users not to employ it until 48 hours after shaving.) These difficulties we refer to as the secondary acid effects.

Petitioner seeks to minimize the effect on the skin by referring to the New York case, in which the testimony was different. The uninhibited material does affect some skin, and, as shown by the "Odorono" directions, should not be used on any skin which is in an abraded condition such as after shaving. (See physical Exhibit 4, introduced at p. 15.) Finding of Fact 18, p. 147, finds irritation to the skin.

In contrast to Petitioner's indifferent attitude toward the subject of skin irritation, we refer to Goodman's Cosmetic Dermatology, p. 438, cited by Petitioner in its

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[5] Finding of Fact 8; R. 146.

[6] Finding of Fact 10 R. 146.

answer, p. 8, and printed at p. 167 of Physical Exhibit 9, which says, (as of 1936)

> "We still await a safe physiological agent to serve the purpose of decreasing the amount of the unwanted perspiration."

Both desirable primary, and undesirable secondary effects are due to the presence of the same H^+ ions.[1] The concentration of the ions had to be retained for astringency, but its effect had to be overcome as against corrosiveness.

The antiperspirant industry was therefore confronted with a problem which appeared incapable of solution. They had to retain the acidity of the astringent material for the purpose of reducing perspiration—that is, retain the primary acid effect of the salts, and yet they had to eliminate the secondary acid effect which resulted from the acidity of the salts and which caused corrosion and irritation. Mechanically it seemed as absurd to try to solve this problem in the way Wallace and Hand did as it would be to dull a razor blade in order to avoid cutting one's face in shaving. Corrosiveness normally is an inevitable consequence of the low pH which is produced by strong acids or their salts with weak bases. Wallace and Hand had to have the low pH—yet wanted to avoid corrosion.

It was quite obvious that corrosion could be reduced by adding anti-acid materials, for example, bases or alkaline materials like borax. Such materials will eliminate corrosiveness by raising the pH of the material, which lowers its acidity. Unfortunately, and quite obviously, they also eliminate the antiperspirant effect, because in the same degree that they reduce acidity and corrosion, they reduce the astringency of the material.

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[1] Finding of Fact 9 and 10 R. 146.

As the District Court found*:

> "Any substantial increase in pH results in a loss of astringency and effectiveness. * * * The corrosive effect could be overcome by the addition of alkaline substances, but such a compound would be valueless as an antiperspirant.
>
> "Urea when added to a solution in the proportion shown in the patent of an acid reactive salt like aluminum chloride, does not materially affect the pH of the salt. In this it differs from alkalis like borax."

Compromises were made in which both corrosiveness and antiperspirant effectiveness were partially reduced, but this was no solution to the problem. (Finding of Fact 18, p. 146, 147. See also p. 309-10 of New York record.)

Wallace and Hand solved the problem by the amazing discovery that urea, which was known to neutralize acids, did *not* neutralize acidity in the required acid antiperspirant salts, whereas other basic materials like borax reduce acidity in both acids and acid salts.

It was known by those skilled in the art that urea, when added to acids as distinguished from acid forming salts, combined with the acids and prevented them from being corrosive. This alkaline property of urea was known. There is, however, no teaching in the prior art that urea could be added to an acid salt without affecting its astringency, or that when added to an acid salt it would affect the later produced corrosiveness of such an acid salt. There is no prior art even relating to a corrosive acid salt and urea.

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* Findings of Fact 8, 12 and 18 R. 146, 147, 148.

4. The Invention Satisfied a Long-felt Need.

Commercial acceptance was prompt. There was a widespread need for a non-corrosive antiperspirant. The introduction of such a product not only led to greatly increased sales of the products under license, but it also caused a substantial reduction in the proportion of the business formerly enjoyed by deodorants. As the Circuit Court of Appeals said, it completely filled the need. [8a]

The two licensed commercial products known as "Fresh" and "Arrid" increased from about 4.5% of the total deodorant and antiperspirant business in 1937 to over 45% in 1945. In the same time, Odorono dropped from 19% to 6%, and the deodorant Mum dropped from 53.5% in 1938 to 28.8% in 1945. The amount of Odorono in 1937 was four times the combined total of Fresh and Arrid, whereas in 1945 the situation was more than reversed. Fresh and Arrid together sold seven times the total of Odorono in that year. These figures are taken from an unprejudiced survey made by Modern Magazines.[9]

The use of Fresh increased from less than 7,400 lbs. in 1937 to over 325,000 lbs. in the 11 months of 1945 for which figures were available.[10] The sales of Arrid increased correspondingly from 65,000 lbs. in 1937 to 1,122,451 lbs.[11] in 1944. As the Circuit Court of Appeals found, there is no question as to the commercial success of the product. (Rec. page 193).

> "In this respect the evidence is convincing that Wallace's composition was tremendously successful commercially. The evidence discloses clearly an exist-

[8a] There is no proof of a single failure.

[9] Exhibit 15, R. 139.

[10] Teller R. 24.

[11] Wallace R. 114.

ing public demand for a compound possessing the desirable qualities mentioned and a fulfillment of that demand by the patented product."

The licensed products were advertised, but there is no indication that the amount of advertising was more than normal in the highly advertised cosmetics business. Odorono and Mum are also well known to be extensive advertisers,[12] but their business decreased relatively.

Petitioner repeatedly states that there was no substantial difference between the New York record and that of the present case. The fact is that no effort was made in the New York case to prove a long felt want or commercial satisfaction of that want. This difference is clearly brought out in the opinions of the respective courts. The New York court found on its record that there was no long-felt want, and this finding of fact is not before this court. The Circuit Court of Appeals of the Seventh Circuit, from whose decision this appeal is taken, found flatly that proof had been made of a demand and a commercial satisfaction of that demand. R. 193. No assignment of errors was made as to this point. This is certainly a difference in the records and we believe it may well have accounted for the difference in the two opinions.

5. Corrosion was a Serious Problem.

Petitioner attempts to belittle the defects of the prior art, although these are specifically covered by Finding of Fact 18 (R. 147). We refer to a few facts to show the character of the corrosion problem.

A cream is obviously much more desirable for an antiperspirant composition than a liquid, since it can be applied more readily, does not spill, may be transported in a purse with safety, and has a much greater sales appeal.

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[12] Reber R. 30.

A corrosive cream, however, is immensely more destructive to skin and to fabrics than is corrosive liquid. A cream does not dry out, but retains its plastic properties when applied to the skin. Therefore, some of the cream is certain to be transferred to the clothing, and is thus more effective in rotting the fabric. A liquid on the other hand, may be applied and if permitted to dry does not readily rub onto the clothing. A striking indication of the need of a cream and the tremendous importance of non-corrosiveness is shown by the label on the "Odorono" bottle, one of which is before this Court as plaintiff's Exhibit 4. The label states as follows:

> "First bathe underarms and dry well. Pat Odo-Ro-No on freely; let it dry thoroughly (15 to 20 minutes). *Rinse well to protect clothing.* (Can be used *before* removing hair or 48 hours *after* shaving)."

Obviously these instructions are given with reluctance. No merchandiser will overemphasize the difficulties of using his product. It may, therefore, safely be assumed that the label states the very minimum in safety requirements for the use of "Odorono." If the directions are followed, it becomes impractical to use the product. The directions are for underarm application. The material is applied wet, and if used as directed, must dry for 15 to 20 minutes. Underarm liquid will not dry if the arms are held in a normal position, so that they should be elevated for the 15 or 20 minutes. Certainly not many have sufficient patience to do so.

One is also advised to wait 48 hours after shaving. One must remember on Thursday to prepare for Saturday. On Saturday there will be two days' growth of hair.

Petitioner asserts that the only improvement lies in the use of an antiperspirant cream. It states that urea is not used with liquid antiperspirants. It offers no support for this statement and there is no support for it in the record.

No attempt was made by either party to show whether liquid antiperspirants treated with urea were on the market. If this had been an issue it could have been shown that such compositions have been, and are being, marketed by Mandel Brothers, as Five Day Pads and Stopette.

There was, of course, no invention in making the antiperspirant in cream form. "Mum" had been available as a cream as long as can be remembered. The desirability of a cream was obvious—the difficulty was that it had to be non-corrosive.

Rotting of clothing is of very serious concern. With aluminum chloride, it will occur immediately at ironing temperature, and in a few days at room temperature. Physical Exhibits 11-14 are samples of cloths treated with astringent salts and then ironed. Of these, numbers 12 and 14 were protected by urea, and the others were unprotected. The corrosion of the unprotected samples is caused by the acidity of the astringent material. At room temperature it will occur in time even though the clothing is several inches from the aluminum chloride itself, as was shown by the test described at record 21 by Mr. Teller. He placed crystals of aluminum chloride in the bottom of a four-ounce bottle, and wrapped a piece of cotton sheeting around the cork of the bottle. After about three weeks the cloth and cork were removed, and the cloth was damaged as seriously as the samples which had been ironed.

The foregoing testimony proves beyond doubt the incorrectness of Petitioner's assertion that corrosion is a problem only at higher temperatures. As with many others of Petitioner's allegations, they are raised for the first time in the Supreme Court, and no expert testimony was offered in the lower court on this point other than the factual testimony just referred to. Petitioner's position contradicts Findings of Fact 18, p. 147, and 10, p. 146.

6. The Prior Art Is Completely Irrelevant.

No prior use shows the use or knowledge of urea to reduce corrosion without correspondingly reducing acidity. No prior art shows the use of urea with a corrosive acid salt for any purpose.

A. The alleged prior use by Wallace and Hand.

No article containing urea was sold more than two years prior to the application for patent, nor did Wallace and Hand ever, prior to the invention in suit, market urea with an astringent salt, or use urea in a manner where it reduced acid corrosiveness without correspondingly reducing acidity.

Not one of the four lower courts found that the alleged prior use by Wallace and Hand was an anticipation. In spite of this fact, petitioner chooses to place its main emphasis on this work. When understood, as the courts below have understood it, it has no relevance at all to the issues here.

The alleged prior use by the patentees reduces itself to this. More than two years before they filed their application, the patentees made and sold an antiperspirant which was at all times corrosive. This compound consisted of a very complex resin of formaldehyde and a sulfonic acid (Rec. 121). This material was an acid and not an acid salt and this distinction is carefully noted by Mr. Wallace on p. 121. The composition was found to be corrosive. Because of that fact, urea was ultimately added to it. The sulphonic acid reacted immediately with the urea, consuming it completely and having its own acidity reduced correspondingly. The testimony to the effect that the urea was completely removed by reaction will be found at pp. 128, 133 and 135. There is not one word of contradictory

testimony in the record. Petitioner's own expert even admitted that urea reacts with acids (p. 89, A. 345).

It was found that the addition of the urea so reduced the acidity of the acid as to destroy its value as an antiperspirant and for this reason some aluminum sulfate was then added. Of course, there was no urea present at any time that aluminum sulfate was present.

We emphasize this because Petitioner repeats over and over again that urea was present in this old "Arrid" composition. The nebulous theory upon which it reaches this conclusion is through an advertisement unconnected to Respondent, which said that the early "Arrid" was noncorrosive. The fact is that it was corrosive and was refused the seal of acceptance of the Good Housekeeping Institute because of that fact (pp. 133-4).

The urea which had been put in the composition was gone in the same way that coal which has burned is gone from a furnace, and that baking powder disappears from biscuits during baking.

In the present case, not only had the urea disappeared by reaction, but it had failed in its intended purpose since it reacted with the acid and reduced its astringency as well as its corrosiveness.

In discussing this prior work, Petitioner refers to acids and acid salts as if they were one and the same thing. As we have pointed out, they are not, and it is the difference between them which is the whole basis for this case. Urea reacts with acids. It does not react with their salts to raise their pH even when these salts are acid. It is easy to be confused, and apparently counsel for Petitioner have been confused on this point. For example, they state on p. 34 of their Brief, that the claims of the patent in suit cover the sulfonic acids of the early "Arrid". The patent covers astringent salts of such acids, but not the acids themselves.

If Petitioner's Brief, at p. 34, is read carefully, it will be found to say just that, but the implication is that there is no difference between acids and acid salts.

Petitioner makes one other comment with respect to this alleged prior use which is new. It says that urea reduced acidity of the acid less than other bases would have done. We find no record support for this statment. It is true only to the limited extent that it takes more urea by weight to achieve a given reduction in acidity than it does with stronger bases, such as sodium hydroxide or borax. In all such cases the reduction in corrosiveness and the reduction in acidity go hand in hand.

The surprising thing is, that Wallace and Hand should have tried urea after it had failed them in the early years. The fact that they had urea at hand and tried it, is no argument against invention, since that is purely a subjective and fortuitous happening. Invention is weighed, not in the light of the particular individuals concerned, but with respect to the unobviousness of the solution generally to those skilled in the art. If this were not the case, then no accidental discovery could be an invention. Mr. Goodyear's vulcanized rubber was no less an invention because he happened to have a stove, sulfur, and rubber all handy.

There was nothing in this case to lead Wallace and Hand to try urea as distinguished from any of the countless other anti-acids which were available.

B. Shipp—2,174,534 (p. 175)

The Shipp patent shows merely the addition of urea to concentrated (65-98%) sulfuric acid in order to slow down momentarily its action upon a textile material. It was found by the Circuit Court of Appeals not to show the present invention and to be from a non-analogous art.

It relates to a composition which could not under any stretch of the imagination be used on the skin. It does not relate to an acid salt but to an acid. It merely shows a slowing down of the action of the concentrated acid.

If urea acted on aluminum chloride or aluminum sulfate as it does on the sulfuric acid of Shipp, it would be useless in an antiperspirant.

Shipp was dealing with the old problem of mercerizing cotton. Cotton was first mercerized by the use of caustic alkalis. Eventually it was discovered that similar results might be obtained by the use of concentrated sulfuric acid. (See Encylopedia Britannica Vol. 15, p. 264, 1941). Mercerization is a chemical change of the cotton, and if the chemical change is permitted to go too far, the cotton will be completely destroyed. Concentrated sulfuric acid is particularly valuable for mercerization because it permits the fibres to be made transparent but its action is so rapid that it is very difficult to operate within the normal time limits. Shipp was seeking a way to slow down the rate of reaction without inhibiting its extent. Concentrated sulfuric acid acts primarily as a dehydrator rather than as an acid.[14] Dehydration is the removal of water from within the molecule of the product. If carried to its utmost it would result in a charring, similar to the well known reaction of concentrated sulfuric acid on wood, sugar, or cellulose.

Because the reaction is dehydration the presence of ex-

[14] R. 96.

cess water is to be avoided. The concentration of the acid can be from 65 to 98%. At each level of concentration the effect differs slightly, but urea is required at all effective levels. Shipp prefers the most concentrated acid. But even a 65% sulfuric acid is a very concentrated acid. Shipp himself points this out at p. 175, column 2, lines 38-43. Hydrochloric acid is considered concentrated at 30%, and cannot be made to exceed 40%. See *Dow* v. *Halliburton*, 324 U. S. 320, 322.

A common method of slowing down a rate of reaction without changing its extent is to add a diluent. In the case of Shipp, the diluent merely had to be one which did not contain or produce water. It did not matter whether the pH of the acid were changed, or even whether a reaction occurred with the acid, if the resulting product still had the same properties for mercerization purposes.[15]

Therefore, Shipp includes many chemicals which will act as non-aqueous diluents, such as common ethyl alcohol, methyl alcohol, and acetone, as well as many other related materials. They do not work in an antiperspirant.[16]

Therefore, Shipp merely taught, as he expressly shows, that urea was the equivalent of organic bases, of ethyl alcohol, methyl alcohol, acetones, and countless other substances as a diluent in combination with sufuric acid. This is not a teaching of retaining acidity for one purpose while

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[15] Concentrated sulfuric acid is practically un-ionized—i.e. it produces practically no hydrogen ions—and therefore is not a true acid. There are more H ions in 70% acid than in 97% acid—yet Shipp uses decidedly less urea at the 70% level. See Mellor Inorganic and Theoretical Chemistry, Vol. X. p. 412. The ionization is measured by the conductivity of the solution which is more than four times as great at 70% as at 97%. This lack of hydrogen ions is why iron vessels may be used to store concentrated acid, while they cannot be used for dilute acids. Shipp mentions this fact at p. 178, col. 2, lines 21-22.

[16] Opinion of Court of Appeals R. 196 Teller R. 96.

overcoming it for another. There was no desire to have or retain acidity as such, nor was there any idea of overcoming its effect. It was purely a retarding situation wherein the rate of reaction was slowed down so that for sixty seconds or so one could proceed with the reaction.

Shipp does not show an anti-acid which does not reduce acidity. There is no teaching in Shipp that corrosion could be entirely overcome by urea, nor a teaching that if corrosion were entirely overcome the acid would have any value. The evidence is actually to the contrary. Urea will react with sulfuric acid, and reduce acidity, Finding of Fact 12, p. 146, but this does not produce an antiperspirant any more than Missbach's dry cleaner produced an antiperspirant. "Any amount of urea that conceivably could be added and still maintain the parchmentizing effect of the acid would not protect fabric from corrosion. It would merely delay the corrosive action."[17]

Nor does urea act in the same way with aluminum chloride or aluminum sulfate that it does with sulfuric acid. If it did, it would be of no value in an antiperspirant.

Wallace and Hand's problem was entirely unrelated. They were not concerned with acids at all. They were dealing with astringent or acid forming salts. It was known all along that the addition of urea to acids would overcome their acidity. There is no teaching in the record either in Shipp or anywhere else that the addition of urea to a corrosive astringent salt would overcome corrosiveness of that salt *without* reducing its acidity. Shipp is not even concerned with an acid salt. He, therefore, cannot teach the all important feature that urea will act differently with an astringent or acid salt than it will with an acid or that it will react differently with an acid salt than other anti-acids.

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[17]Teller R. 97.

C. Koch—2,011,292—(R. 171).

Koch does not add urea to anything to overcome corrosiveness. No ingredient used by him is corrosive. He added urea to stabilize an unstable non-corrosive salt, but in this he was unsuccessful. There is nothing to indicate urea would act differently than an anti-acid like borax. As the Circuit Court of Appeals for the 7th Circuit said, page 194:

> "Koch was coping with the problem of a stable solution of aluminum acetate and aluminum formate."

Aluminum acetate and aluminum formate are non-corrosive substances used as mordants in the dyeing of fabrics. Both have a tendency to decompose in water and form insoluble products. The salts, the acids from which they are formed, and the insoluble products are all harmless to clothing.

Koch added urea in an attempt to prevent the formation of the insoluble precipitates. He did not accomplish this purpose, as Mr. Teller testified (Rec. 102). Even defendant's expert, Mr. De Navarre, admitted that if Koch worked in the manner claimed by him, there would be more decomposition rather than less (Rec. 74). Mr. De Navarre wrote a book some years after Koch was issued in which he stated that aluminum acetate cannot be stabilized except by borax. (R. p. 74) Therefore, if urea did stabilize aluminum acetate, it would not act differently than borax (an alkaline material which fails in an antiperspirant, p. 146 Finding 12). This does teach a difference in the action of borax and urea.

In spite of these facts, petitioner claims that Koch uses urea to prevent corrosion, relying upon a statement in

column 1, lines 37-42 of the patent (Rec. 171), which is as follows:

> "The solutions of these products may be used with special advantage in the textile industry because they do not contain any substances which would have detrimental effect when used, for instance, for impregnation purposes."

The statement is literally and factually true. Not one ingredient of the mixture is detrimental to cloth. Urea is not needed to make some normally harmful salt harmless (Rec. 103) because no harmful salt is present.

Petitioner relies upon Mr. de Navarre's testimony that aluminum acetate would deteriorate cloth. This was contradicted by Teller (Rec. 103); and on cross-examination de Navarre admitted that he had no basis or experience for his testimony. (See Q. and A. 145 and 148 on Page 72).

It was in connection with the Koch patent that Mr. de Navarre, trying to justify his testimony, finally asserted "The peculiarities of urea are such that the literature is not certain what happens with many straight compounds, let alone those that go into reversal."[18]

D. Missbach—2,069,711—(R. 173).

This patent merely shows the use of urea to neutralize an acid—not an acid salt. There was no need to preserve acidity, and other bases or anti-acids would have served as well as urea. In fact, some of the materials shown by Missbach as equivalents of urea are the usual type of basic materials which would be completely worthless in an anti-perspirant. This is true for example of the guanidine materials disclosed on page 174. This was pointed out by Mr. Teller at page 96.

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[18] R. 75.

7. Non-Analogous Art.

An inventor is conclusively presumed to know the prior art in his own and clearly allied fields of endeavor. This, of course, like the rule that one is presumed to know the law, is a legal fiction. It is imposed so that one cannot claim as an invention what he might reasonably have learned by the exercise of a normal amount of ingenuity. As the field of science has grown, and the size of the libraries has multiplied almost infinitely, this has put a growing burden upon the inventor.

When it comes, however, to assembling bits of knowledge, which when put together might suggest a solution, the courts have reasonably and intelligently drawn a line.

Information which does not directly anticipate an invention, must have been learned in an art which is analogous to that in which the invention is made. This simply means that the information must either have been in the same art or business as that in which the inventor is working, or in an art which is so analogous that any reasonable person might have been expected to look there.

As was said in *A. J. Deer Co., Inc.* v. *U. S. Slicing Machine Co.*, 21 F. (2d) 812 (CCA 7):

> "If elements and purposes in one art are related and similar to those in another art, and because and by reason of that relation and similarity make an appeal to the mind of a person having mechanical skill and knowledge of the purposes of the other art, then we are of the opinion that such arts must be said to be analogous, and, if the converse is true, they are non-analogous arts."

The Circuit Court of Appeals for the Fourth Circuit found that the removal of hair from animal hides, and the removal of hair by the same group of compounds from

human skin, were not analogous, partially because the times involved in the two processes were quite different. *Hutzler Bros. Co.* v. *Sales Affiliates,* 164 F. (2d) 260, 264. The use of copper to absorb ammonia in a gas mask was found non-analogous to the use of the same material for the same purpose in illuminating gas. *Yablick* v. *Protecto Safety Appliance Corp.,* 21 F. (2d) 885, 886 (CCA 3).

This court found that apparatus for conditioning tobacco and other materials, as well as other procedures for ventilation, were quite remote from the problems and the procedure for ventilating incubators for the hatching of eggs. *Smith* v. *Snow,* 294 U. S. 1, 17.

So with the Shipp patent. It dealt with the application of concentrated acid to cotton cloth. The urea reacted with the acid. It managed to slow up but not to stop the disintegrating effect of the acid. There is nothing in what he did which would suggest an answer to the problem presented to Wallace and Hand. The information in Shipp was not even available to the public since it was not published until three years after Wallace and Hand made their discovery.

No one dealing with an antisperspirant would think of looking for help in such a process.

Wallace and Hand Made a Patentable Invention.

This is one of those rare cases where the discovery appears simple to the uninformed but inexplicable to the expert. Many things are mysterious to the uninformed. In the present case, however, once urea has been found to do the trick; it is easy to make it seem simple; and it is only on thorough understanding that the problem is brought into its true light.

For that reason we have included an appendix in this brief setting forth the chemical background of acid formation in water solutions. This is elementary chemistry, but it needs to be thoroughly understood to know why the selection of urea was completely unobvious.

Acidity is measured by pH, which is simply hydrogen ion concentration. As the court found, the lower the pH, the greater the acidity (p. 146). This is true of acids and of acid reacting astringent salts like aluminum chloride.

All known basic or anti-acid materials lower the acidity of acids. All anti-acids or basic materials except the urea group lower the acidity of acid reacting salts (Finding of Fact, p. 146). Urea does not, yet it protects the skin and cloth against corrosion from such salts, either at room temperature or advanced temperature. There is no prior art showing that this property of urea was known. In the absence of such knowledge there is nothing which would have led the patentees to try urea.

8. The New York Decision, 133 F. (2d) 763.

The New York decision makes a number of statements which, at least upon the present record, are entirely incorrect.

It finds that there was no long felt want. This finding was based upon the absence of proof of commercial success or of the problem involved. The Seventh Circuit

Court of Appeals found specifically that there was a long felt want (p. 193):

> "The evidence discloses clearly an existing public demand for a compound possessing the desirable qualities mentioned and a fulfillment of that demand by the patented product."

The Court of Appeals of the 2nd Circuit found that the invention came about as the result of routine experiment. This finding was based on a number of factors which were incorrect. The court found no long felt want, whereas we have proved one. It referred to Killian as an independent inventor, whereas he was Wallace's helper at a later date and is not even cited here. It cited a Montenier patent as prior, whereas it was antedated by Wallace and Hand in both cases. Actually, as we have pointed out, a routine experimenter would never have tried urea. The known properties of urea indicated that it would work like other anti-acids or bases, and if it had worked like a base it would have been without value. Apparently the 2nd Circuit Court of Appeals failed to distinguish between acids and acid salts, and to notice that while other anti-acids acted the same with acids as with acid salts, urea did not do so. If the New York court had understood the true facts, its own language at p. 764 would have led that court to find the present discovery patentable. The court said:

> "This is not to say that such steps might not perhaps lead to invention, if the result was sufficiently unexpectable."

The present result is so unexpected that no one has as yet been able to explain it.

There Was a Long Felt Want.

The Court of Appeals specifically found the existence of a long felt want and its commercial satisfaction (R. 193):

> "We think, too, that the evidence discloses clearly an existing public demand for a compound possessing the desirable qualities mentioned and a fulfillment of that demand by the patented product."

No assignment of error was taken as to this finding of the court. While the evidence to support the finding is clear, as the Circuit Court of Appeals found, it is not one of the issues presented here.

There is no question as to the need for the noncorrosive antiperspirant. There is no question as to commercial success. Apparently even petitioner does not deny it. The commercial success was not achieved by any unusual advertising (p. 36).

The fact that urea could be used without reducing the acidity of an acid salt was completely unknown and unobvious from any prior art. This should spell invention. If there be any doubt, the long continued problem and its recognition should bring this case within the language of this court in *Goodyear* v. *Ray-O-Vac*, 321 U. S. 275 at 279:

> "During a period of half a century, in which the use of flashlight batteries increased enormously, and manufacturers of flashlight cells were conscious of the defects in them, no one devised a method of curing such defects. Once the method was discovered it commended itself to the public as evidenced by marked commercial success."

9. A Three Party Interference is no Evidence of Lack of Invention.

The existence of a three party interference is no indication of lack of invention.

Petitioner argues, at page 36 of its brief, that the existence of a three-party interference in the Patent Office proves lack of invention. That there may be cases where simultaneous discovery by a large number of persons can be evidence of lack of invention we do not deny. In the present case there is no evidence whatsoever that Montenier or Teller arrived at their disclosure independently of Wallace and Hand. But even if they did, Congress, at least, since as far back as 1870, has made specific provision for interferences between pending patent applications (Title 35, Section 52, U. S. C.). It is obvious that Congress did not consider simultaneous discovery as an indication of unpatentability. In the *Telephone* cases, 126 U. S. 1, 551, at least 5 different inventors were involved in interferences.

10. The Cases Cited by Petitioner.

Petitioner has cited a great number of cases, most of them merely prescribing known rules of law with which we have no quarrel. Each patent case stands largely on its own feet when the question of invention is to be considered, and we will therefore discuss only those cases of Petitioner which require some special comment on the facts.

The only test of invention was announced by this court in *Hotchkiss* v. *Greenwood*, 11 How. 248 in 1851, and has been acquiesced in by Congress since that time. A patentee must do more than would be expected of the ordinary person acquainted with the business. We have shown beyond a doubt that no one acquainted with the business would have considered it possible that urea would work differently than the other anti-acids.

Therefore any discussion of the cases relied upon by Petitioner need only be to indicate the inapplicability of the facts.

In the *Dow* v. *Halliburton* case, 324 U. S. 320, the problem was not the selection of a particular inhibitor: All inhibitors worked. Here other corrosion inhibitors were not successful. Furthermore, in that case, the court found that as soon as the need for an inhibitor arose, the usual inhibitors were employed.

The case of *Funk* v. *Kalo*, 333 U. S. 127, decided recently by this court, is urged by Petitioner as showing that there is no patentable combination in the invention here in suit.

In the *Kalo* case, the bacteria at no time affected the actions of each other, and therefore it might have been truly said that there was no patentable combination. In the present case, there is a true modification of the action of the salt whenever occasion arises where it might be corrosive. Whether this starts instantly in the container, or whether it is a delayed action, we do not know. Nevertheless, the experiment shown on page 21 of the record indicates that the urea modifies the action of the acid salt at all times. There, unmodified aluminum chloride in a bottle rotted cloth several inches away at room temperature—and did not do so when urea was added. This indicates an immediate and constant cooperation without reaction between the ingredients. But such continuous cooperation is not required for a true invention. It is enough that at the required times there should be such integration. Otherwise, to cite an obvious example, an automobile engine would only be a combination when actually running, and since it does not run all the time, would not be patentable.

Nor is this a case where Wallace and Hand discovered a natural law and applied it to an obvious use. There is still no known natural law by which urea would act differently with an acid salt than it does with an acid—or any known reason why it acts differently with an acid salt than do other anti-acids.

11. Petitioner's Specification of Errors.

Petitioner at p. 19 of its Brief, presents four alleged specifications of error. The first three of these specifications make it appear that the decision of the Circuit Court of Appeals of the Seventh Circuit was very much different from the actual decision.

Of course the issue here presented is the validity of the patent in suit. It, therefore, seems unnecessary to discuss whether Petitioner's specification of errors correctly analyzes the decision of the Court of Appeals. Nevertheless there are several misstatements in the Specifications which are quite misleading.

In the second Specification, for example, Petitioner states that the Court of Appeals found knowledge in the prior art that urea has the ability to inhibit corrosion in the presence of acid.

The Circuit Court of Appeals actually found the opposite. On p. 199 the Court found:

> "Shipp merely slowed up the disintegrating effect of the concentrate. He did not inhibit or bar it."

Secondly, the Specification states or implies that urea could be present in acid and still inhibit its corrosion. The evidence shows without contradiction that urea combines with acid and reduces its corrosiveness only to the extent that it does combine. In this respect urea is like all other anti-acids.

CONCLUSION.

That urea, unlike other anti-acids, has the unique power to inhibit corrosion without reducing the acidity of an acid salt was not only unpredictable but was directly contrary to what was expected by those skilled in the art.

Until this discovery by Wallace and Hand, that property of urea had never been observed or utilized in an antiperspirant or in any other product. In Wallace and Hand's earlier work with antiperspirants, some urea had been used with an acid and had reduced both the corrosion and acidity, as would be expected with an acid.

The invention resulted in a wholly new, safe and extremely popular antiperspirant, and the Court of Appeals for the Seventh Circuit should be affirmed in holding it patentable.

Respectfully submitted,

CHARLES J. MERRIAM,
BERNARD A. SCHROEDER.

October 5, 1948.

APPENDIX.

As we have explained in the brief, acidity, whether of an acid, or of an astringent salt, is due to and measured by, the presence of hydrogen ions. The concentration of the ions is measured in either case by the pH, which is low when the concentration of hydrogen ions is high. We will attempt in this appendix to give a simple explanation of how these ions are formed in the presence of water. Water is present, of course, in liquid anti-perspirants and in creams. The record basis for the explanation to be given will be found in the testimony of Mr. Teller at pages 18, 19, 91 and 92. It is not contradicted by Petitioner's Expert, and is the basis for several findings of fact, particularly 8, 9, 12, and 18. These will be found at pages 146 and 147.

When any salt, or acid, or base is dissolved in water it forms positively charged and negatively charged ions. For example, when aluminum chloride ($AlCl_3$) is added to water it dissolves and the dissolved material is almost completely ionized, one molecule of $AlCl_3$ dividing into one aluminum ion which carries three positive charges (Al^{+++}), and three negative chloride ions ($3Cl^-$). When ordinary salt (NaCl) is added to water the same thing occurs except that one positively charged sodium (Na^+)ion and one negatively charged chloride ion (Cl^-) are formed. It is the presenee of these ions which permits solutions of salts to carry electric current.[19]

The establishment of an acid solution from a salt like aluminum chloride is due to hydrolysis.

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[19] Teller 18, 19, 91, 92. See also Encyc. Brit. 1941, Vol. 5 p. 344; Vol. 11 p. 981.

When aluminum chloride is added to water, it becomes Al^{+++} and $3Cl^-$ ions.

$$AlCl_3 \rightleftharpoons Al^{+++} + 3Cl^-$$

Water itself is slightly ionized into positively charged hydrogen ions and negative OH ions.

$$H_2O \rightleftharpoons H^+ + OH^-$$

The number of hydrogen ions as compared to OH ions determines the acidity of the solution.

Strong acids like hydrochloric acid and strong bases like sodium hydroxide are almost completely ionized in normally dilute solutions as indicated by the following equations.

$$HCl \rightleftharpoons H^+ + Cl$$

$$NaOH \rightleftharpoons Na^+ + OH^-$$

All of these equations or ionizations are reversible, as indicated by pointing the arrows in both directions. That is, ions are always uniting to form acids, bases or salts and the acids, bases and salts are always breaking down into ions. In the case of salts, strong acids and strong bases, nearly all of the material is ionized all the time. In the case of weak acids and bases ionization is frequently very incomplete. For example, aluminum hydroxide is very slightly ionized. This means that if Al^{+++} ions and OH^- ions are both present in a solution they will tend to go together and form the un-ionized base.

With this chemical background it is possible to analyze what happens when aluminum chloride is added to water. The first reaction is that water itself is slightly ionized as follows:

$$H_2O \rightleftharpoons H^+ + OH^-$$

The aluminum chloride ionizes as follows:

$$AlCl_3 \rightleftharpoons Al^{+++} + 3Cl^-$$

Cross reactions also occur. The aluminum ions and the OH ions combine almost completely to form the very little ionized aluminum hydroxide:

$$Al^{+++} + 3OH \xrightarrow[\text{totally}]{\text{almost}} Al(OH)_3$$

On the other hand the hydrogen ions and the chloride ions combine very little to form hydrochloric acid. The result is that the OH ions are removed from the solution and the hydrogen ions are not.

The case of aluminum chloride in water is summarized below. Arrows in both directions indicates reversibility, and the relative size of the arrows indicates the predominative direction of the reaction.

$$AlCl_3 + 3H_2O \leftrightharpoons 3H^+ + 3Cl^- + Al^{+++} + 3OH^-$$

$$3H^+ + 3Cl^- \rightarrow 3HCl \qquad Al^{+++} + 3OH^- \rightarrow Al(OH)_3$$

It will be seen that aluminum hydroxide will build up, thus leaving an excess of hydrogen ions.

As a result the solution becomes almost as acid as a solution of hydrochloric acid itself as its low pH shows.

Hydrogen ions in a solution of an acid, and hydrogen ions in a solution of an acid salt, are identical and would be expected to react in the same manner with urea when it is added. The patentees discovered that this was not the case. No one yet knows why it is not the case.

As shown above, a solution of aluminum chloride con-

tains *all* the ions present in hydrochloric acid. Yet it behaves differently with urea.[1] It leaves the acid available and uninhibited for stopping perspiration, but for some reason stops its undesirable corrosiveness to the skin and to fabrics at all temperatures. We have discussed aluminum chloride because it is simpler, but aluminum sulfate acts in the same manner, forming sulfuric acid instead of hydrochloric.

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[1]See Finding of Fact 12, p. 146. See also the charts at pages 159-162 of the New York Record Physical Exhibit 9, and the testimony at pages 45-49 of that record explaining them. These were incorporated by reference of Dr. Wallace at p. 137 of this record. The charts show that urea decreases the conductivity of an acid by reaction but does not decrease conductivity of astringent salts.